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(54) **REFRIGERATION SYSTEM FOR A REFRIGERATOR APPLIANCE**

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F25D 11/02	(2006.01)
F25D 21/08	(2006.01)

(52) **U.S. Cl.**

CPC ***F25B 47/02*** (2013.01); ***F25D 11/022*** (2013.01); ***F25D 21/08*** (2013.01); *F25B 2347/022* (2013.01); *F25B 2600/2511* (2013.01); *F25D 2700/12* (2013.01); *F25D 2700/122* (2013.01)

(58) **Field of Classification Search**

CPC . F25D 11/022; F25B 2347/022; F25B 47/022

See application file for complete search history.

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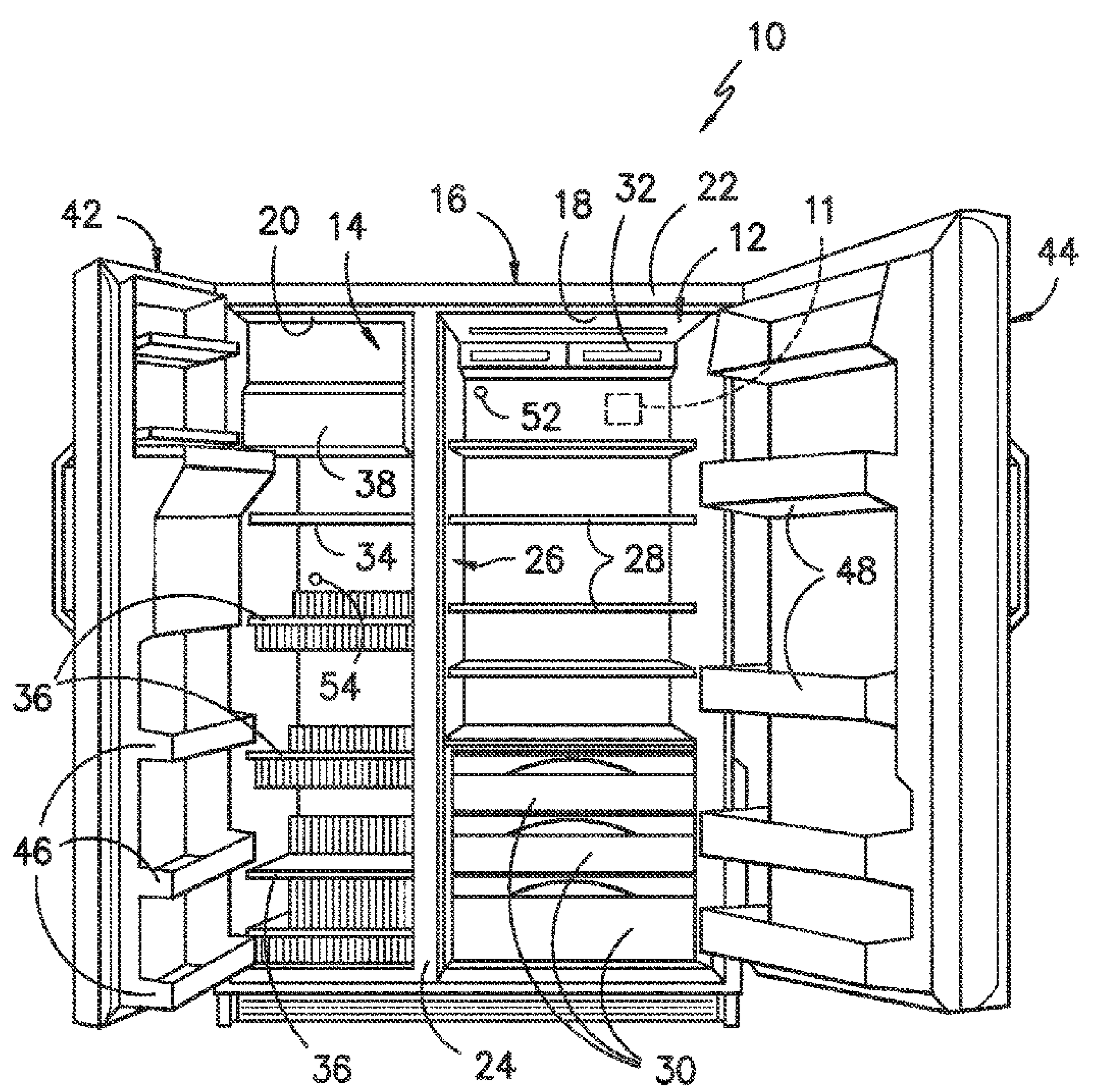
(57) **ABSTRACT**

Refrigeration systems and refrigerator appliances are provided. A refrigeration system includes a compressor for compressing a refrigerant, a first evaporator, and a second evaporator. The refrigeration system further includes a conduit for flowing the refrigerant through one of the first evaporator or the second evaporator, the conduit configured around the other of the first evaporator or the second evaporator such that heat exchange occurs between the refrigerant flowing through the conduit and the other of the first evaporator or the second evaporator.

20 Claims, 3 Drawing Sheets



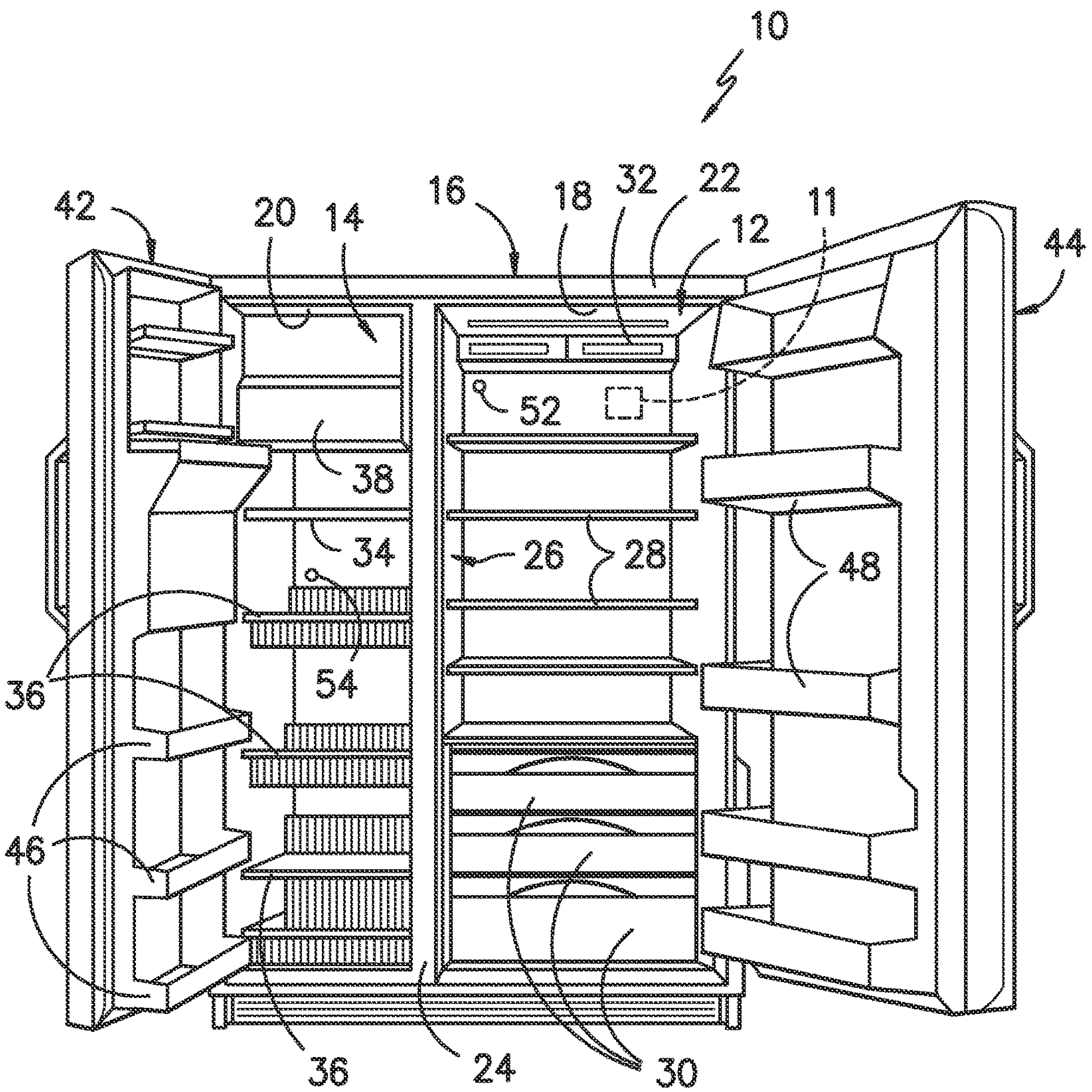


FIG. –1–

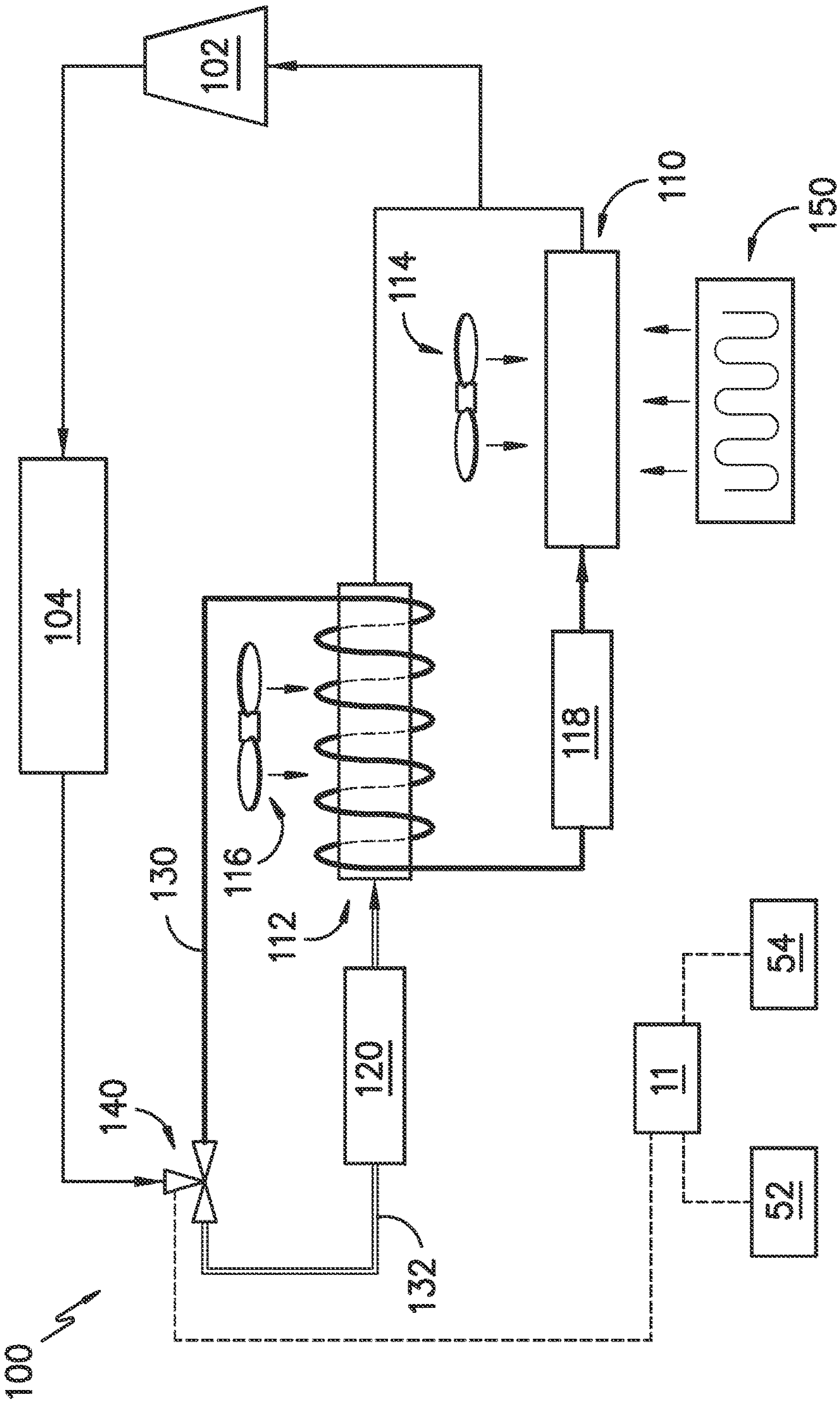


FIG. -2-

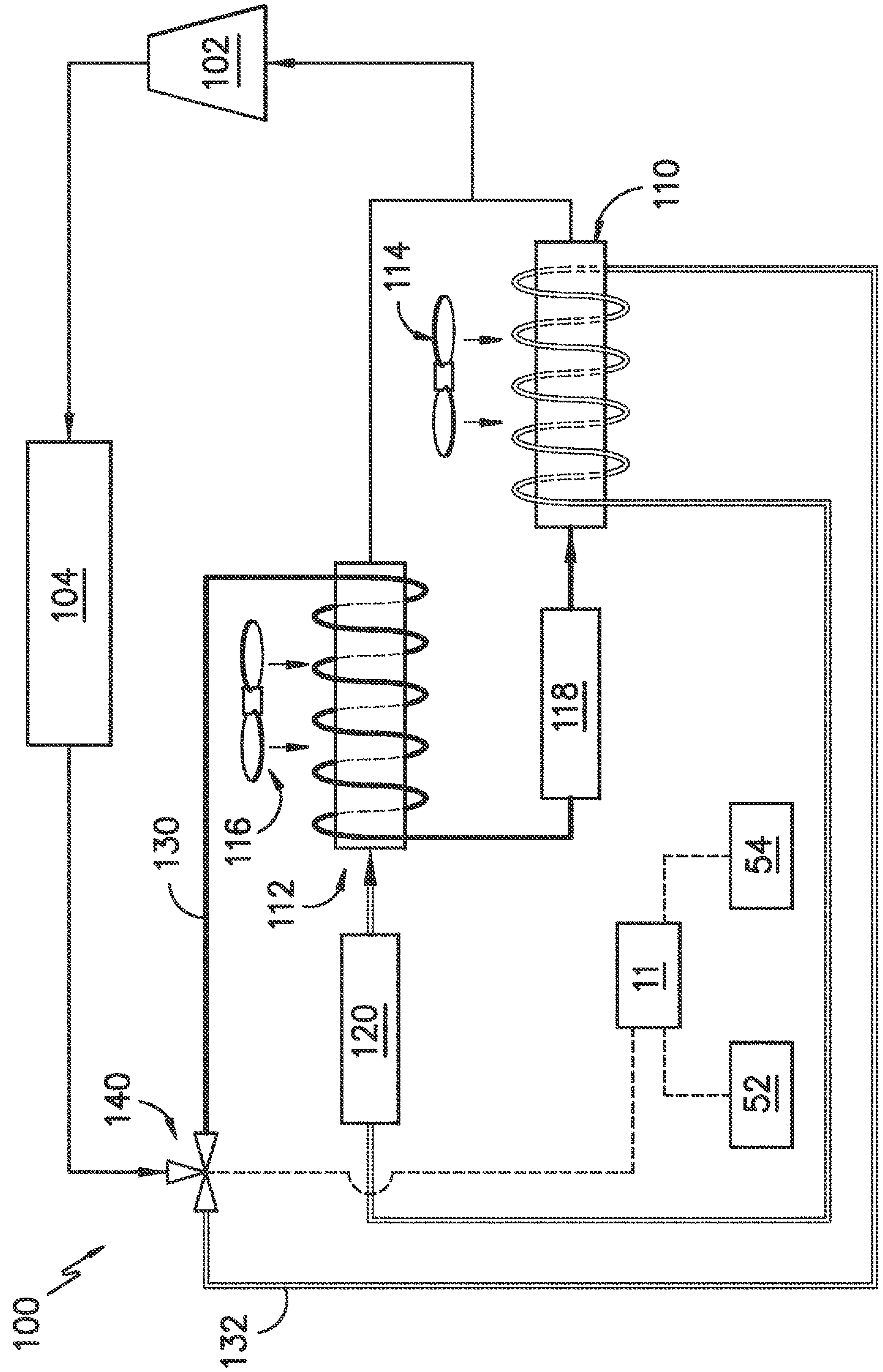


FIG. -3-

REFRIGERATION SYSTEM FOR A REFRIGERATOR APPLIANCE

FIELD OF THE INVENTION

The subject matter of the present disclosure relates generally to refrigerator appliances, and more particularly to refrigeration systems having multiple evaporators for use with refrigerator appliances.

BACKGROUND OF THE INVENTION

A commonly available design for a refrigeration appliance, particularly one for consumer use, includes a cabinet that contains a freezer compartment and a fresh food compartment. These compartments may be arranged e.g., side by side or may include one positioned over the other. Refrigeration systems are typically utilized to cool the compartments.

In one example of a conventional design, the evaporator of a refrigeration system is positioned in the freezer compartment where a fan moves air in the freezer compartment across the evaporator to freeze the contents of the freezer compartment. A damper positioned between the freezer compartment and the fresh food compartment is used to feed a portion of the air over to the fresh food compartment for cooling its contents. In another example of a conventional design, a refrigeration system may utilize multiple evaporators, such as an evaporator to freeze the contents of the freezer compartment and an evaporator to cool the contents of the fresh food compartment.

Presently known multiple evaporator systems can, however, have disadvantages. For example, when one or both evaporators are off, frost can accumulate on the evaporator(s). This frost can reduce the efficiency of the associated evaporator. One effort to reduce or eliminate frost has been to utilize a heater, such as an electric heater, to heat the evaporator(s) when they are not operating. However, the addition of a heater to the system adds cost and complexity to the system, and increases the energy consumption of the system.

Accordingly, improved refrigerator appliances and refrigeration systems therefore are desired. In particular, cost- and energy-effective refrigerator appliances and refrigeration systems which reduce evaporator frost build-up would be advantageous.

BRIEF DESCRIPTION OF THE INVENTION

In one embodiment, a refrigeration system for a refrigerator appliance is disclosed. The refrigeration system includes a compressor for compressing a refrigerant, a first evaporator, and a second evaporator. The refrigeration system further includes a conduit for flowing the refrigerant through one of the first evaporator or the second evaporator, the conduit configured around the other of the first evaporator or the second evaporator such that heat exchange occurs between the refrigerant flowing through the conduit and the other of the first evaporator or the second evaporator.

In another embodiment, a refrigerator appliance is disclosed. The refrigerator appliance includes a fresh food compartment, a frozen food compartment, and a refrigeration system. The refrigeration system includes a compressor for compressing a refrigerant, a condenser downstream of the compressor for receiving the refrigerant from the compressor and condensing the refrigerant, a first evaporator configured for cooling the fresh food compartment, and a second evaporator configured for cooling the frozen food compartment. The refrigeration system further includes a conduit for flowing the refrigerant through one of the first evaporator or the second evaporator, the conduit configured around the other of the first evaporator or the second evaporator such that heat exchange occurs between the refrigerant flowing through the conduit and the other of the first evaporator or the second evaporator.

These and other features, aspects and advantages of the present invention will become better understood with reference to the following description and appended claims. The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

A full and enabling disclosure of the present invention, including the best mode thereof, directed to one of ordinary skill in the art, is set forth in the specification, which makes reference to the appended figures, in which:

FIG. **1** provides an exemplary embodiment of a refrigerator appliance in accordance with one embodiment of the present disclosure;

FIG. **2** provides a schematic diagram of a refrigeration system in accordance with one embodiment of the present disclosure; and

FIG. **3** provides a schematic diagram of a refrigeration system in accordance with another embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE INVENTION

Reference now will be made in detail to embodiments of the invention, one or more examples of which are illustrated in the drawings. Each example is provided by way of explanation of the invention, not limitation of the invention. In fact, it will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope or spirit of the invention. For instance, features illustrated or described as part of one embodiment can be used with another embodiment to yield a still further embodiment. Thus, it is intended that the present invention covers such modifications and variations as come within the scope of the appended claims and their equivalents.

FIG. **1** provides a front view of a representative refrigerator appliance **10** in an exemplary embodiment of the present invention. More specifically, for illustrative purposes, the present invention is described with a refrigerator appliance **10** having a construction as shown and described further below. As used herein, a refrigerator appliance includes appliances such as a refrigerator/freezer combination, side-by-side, bottom mount, compact, and any other style or model of a refrigerator appliance. Accordingly, other configurations including multiple and different styled compartments could be used with refrigerator appliance **10**, it being understood that the configuration shown in FIG. **1** is by way of example only.

Refrigerator appliance **10** includes a fresh food storage compartment **12** and a freezer storage compartment **14**. Freezer compartment **14** and fresh food compartment **12** are arranged side-by-side within an outer case **16** and defined by inner liners **18** and **20** therein. A space between case **16** and liners **18** and **20**, and between liners **18** and **20**, is filled with foamed-in-place insulation. Outer case **16** normally is formed by folding a sheet of a suitable material, such as pre-painted steel, into an inverted U-shape to form the top and side walls of case **16**. A bottom wall of case **16** normally is formed separately and attached to the case side walls and to a bottom frame that provides support for refrigerator appliance **10**. Inner liners **18** and **20** are molded from a suitable plastic material to form freezer compartment **14** and fresh food compartment **12**, respectively. Alternatively, liners **18**, **20** may be formed by bending and welding a sheet of a suitable metal, such as steel.

A breaker strip **22** extends between a case front flange and outer front edges of liners **18**, **20**. Breaker strip **22** is formed from a suitable resilient material, such as an extruded acrylo-butadiene-styrene based material (commonly referred to as ABS). The insulation in the space between liners **18**, **20** is covered by another strip of suitable resilient material, which also commonly is referred to as a mullion **24**. In one embodiment, mullion **24** is formed of an extruded ABS material. Breaker strip **22** and mullion **24** form a front face, and extend completely around inner peripheral edges of case **16** and vertically between liners **18**, **20**. Mullion **24**, insulation between compartments, and a spaced wall of liners separating compartments, sometimes are collectively referred to herein as a center mullion wall **26**. In addition, refrigerator appliance **10** includes shelves **28** and slide-out storage drawers **30**, sometimes referred to as storage pans, which normally are provided in fresh food compartment **12** to support items being stored therein.

Refrigerator appliance **10** can be operated by one or more controllers **11** or other processing devices according to programming and/or user preference via manipulation of a control interface **32** mounted e.g., in an upper region of fresh food storage compartment **12** and connected with the controller. The controller may include one or more memory devices and one or more microprocessors, such as a general or special purpose microprocessor operable to execute programming instructions or micro-control code associated with the operation of the refrigerator appliance. The memory may represent random access memory such as DRAM, or read only memory such as ROM or FLASH. In one embodiment, the processor executes programming instructions stored in memory. The memory may be a separate component from the processor or may be included onboard within the processor. The controller may include one or more proportional-integral (PI) controllers programmed, equipped, or configured to operate the refrigerator appliance according to exemplary aspects of the control methods set forth herein. Accordingly, as used herein, “controller” includes the singular and plural forms.

The controller may be positioned in a variety of locations throughout refrigerator appliance **10**. In the illustrated embodiment, the controller may be located e.g., behind an interface panel **32** or doors **42** or **44**. Input/output (“I/O”) signals may be routed between the control system and various operational components of refrigerator appliance **10** along wiring harnesses that may be routed through e.g., the back, sides, or mullion **26**. Typically, through user interface panel **32**, a user may select various operational features and modes and monitor the operation of refrigerator appliance **10**. In one embodiment, the user interface panel may represent a general purpose I/O (“GPIO”) device or functional block. In one embodiment, the user interface panel **32** may include input components, such as one or more of a variety of electrical, mechanical or electro-mechanical input devices including rotary dials, push buttons, and touch pads. The user interface panel **32** may include a display component, such as a digital or analog display device designed to provide operational feedback to a user. The user interface panel may be in communication with the controller via one or more signal lines or shared communication busses.

In one exemplary embodiment of the present invention, one or more temperature sensors are provided to measure the temperature in the fresh food compartment **12** and the temperature in the freezer compartment **14**. For example, first temperature sensor **52** may be disposed in the fresh food compartment **12**, and may measure the temperature in the fresh food compartment **12**. Second temperature sensor **54** may be disposed in the freezer compartment **14**, and may measure the temperature in the freezer compartment **14**. This temperature information can be provided, e.g., to the controller **11** for use in operating refrigerator **10** as will be more fully discussed below. These temperature measurements may be taken intermittently or continuously during operation of the appliance and/or execution of a control system as further described below.

A shelf **34** and wire baskets **36** are also provided in freezer compartment **14**. In addition, an ice maker **38** may be provided in freezer compartment **14**. A freezer door **42** and a fresh food door **44** close access openings to freezer and fresh food compartments **14**, **12**, respectively. Each door **42**, **44** is mounted to rotate about its outer vertical edge between an open position, as shown in FIG. **1**, and a closed position (not shown) closing the associated storage compartment. In alternative embodiments, one or both doors **42**, **44** may be slidable or otherwise movable between open and closed positions. Freezer door **42** includes a plurality of storage shelves **46**, and fresh food door **44** includes a plurality of storage shelves **48**.

Referring now to FIGS. **2** and **3**, refrigerator appliance **10** may include a refrigeration system **100**. In general, refrigeration system **100** is charged with a refrigerant which is flowed through various components and which facilitates cooling of the fresh food compartment **12** and the freezer compartment **14**. For example, refrigeration system **100** may include a compressor **102** for compressing the refrigerant, as is generally understood, thus raising the temperature and pressure of the refrigerant. Compressor **102** may for example be a variable speed compressor, such that the speed of the compressor **102** can be varied between zero and 100 percent by the controller **11**. Refrigeration system **100** may further include a condenser **104**. The condenser **104** may be disposed downstream (in the direction of flow of the refrigerant) of the compressor **102**. Thus, condenser **104** may receive refrigerant from the compressor **102**, and may condense the refrigerant, as is generally understood, by lowering the temperature of the refrigerant flowing therethrough due to for example heat exchange with ambient air. Alternatively, it should be noted that condensation of the refrigerant may occur in some refrigeration systems **100** without a condenser **104**, such as in suitably configured conduits extending between the compressor **102** and evaporator(s) as discussed herein.

Refrigeration system **100** may further include a first evaporator **110** and a second evaporator **112**, both disposed downstream of the condenser **104**. Evaporators **110**, **112** generally are heat exchangers that transfer heat from air passing over the evaporator **110**, **112** to refrigerant flowing through the evaporators **110**, **112**, thereby cooling the air and causing the refrigerant to vaporize. Evaporator fans **114**, **116** may be used to force air over respective evaporators **110**, **112** as illustrated. As such, cooled air is produced and supplied to refrigerated compartments **12**, **14** of refrigerator appliance **10**. In one exemplary embodiment of the present invention, fans **114**, **116** can be variable speed evaporator fans—meaning the speed of fans **114**, **116** may be controlled or set anywhere between and including, for example, 0 and 100 percent. The speed of the evaporator fans **114**, **116** can be determined by, and communicated to, the evaporator fans **114**, **116** by the controller.

One of the evaporators **110**, **112** may be in communication with the fresh food compartment **12**, while the other is in communication with the freezer compartment **14**. For example, evaporator **110** may provide cooled air to the fresh food compartment **12** and evaporator **112** may provide cooled air to the freezer compartment **14**, or vice versa. Alternatively, an evaporator **110**, **112** may be in communication with any suitable component of the refrigerator appliance **10**. For example, in some embodiments, an evaporator **110**, **112** may be in communication with ice maker **38**, such as with an ice compartment of the ice maker **38**. (Alternatively, ice maker **38** may be cooled by the evaporator **110**, **112** that is in communication with the freezer compartment **14** or fresh food compartment **12**). Other evaporators **110**, **112** may be in communication with the fresh food compartment **12** and/or freezer compartment **14**, as desired.

It should be understood that the present disclosure is not limited to two evaporators **110**, **112**. Rather, three, four, five, six or more evaporators may be utilized. The various evaporators may interact with each other to provide selective and alternative defrosting thereof as discussed herein.

From evaporators **110**, **112**, refrigerant may flows back to and through compressor **102**, which may be downstream of the evaporators **110**, **112**, thus completing a closed refrigeration loop or cycle. Additionally, first and second expansion devices **118**, **120** may be utilized to expand the refrigerant, thus further reduce the pressure of the refrigerant, leaving condenser **104** before being flowed to the respective evaporator **110**, **112**. Expansion devices **118**, **120** in exemplary embodiments are disposed downstream of condenser **104** and upstream of the respective evaporators **110**, **112**.

Various conduits may be provided for flowing the refrigerant through the various other components of the refrigeration system **100**. In exemplary embodiments, for example, a conduit, such as a first conduit **130**, may be provided for flowing refrigerant through either the first evaporator **110** or the second evaporator **112**. In the embodiments illustrated, conduit **130** flows refrigerant through first evaporator **110**.

Conduit **130** may further, in exemplary embodiments, be configured around the other of the first evaporator **110** or the second evaporator **112**, such as the second evaporator **112** as illustrated. For example, conduit **130** may be in contact with and/or coiled around, or otherwise at least partially surrounding, the other evaporator. Such proximity of the conduit **130** to the other evaporator may advantageously allow heat exchange, such as indirect heat exchange, to occur between the refrigerant flowing through the conduit **130** and this other of the first evaporator **110** or the second evaporator **112**. In exemplary embodiments, the associated expansion device **118**, **120**, such as expansion device **118** in the embodiments illustrated, may be disposed downstream of the other of the first evaporator **110** or the second evaporator **112**. Thus, refrigerant flowing through the conduit **130** at the location configured around the other of the first evaporator **110** or the second evaporator **112** may be generally warmer than that other evaporator **110**, **112**, and may melt or otherwise facilitate removal of frost on the evaporator **110**, **112**. Such refrigerant may then be flowed through the associated expansion device **118**, **120** and through the one of the first evaporator **110** or the second evaporator **112** to cool the air flowed past the one of the first evaporator **110** or the second evaporator **112** and facilitate cooling of the fresh food compartment **12** or freezer compartment **14**.

As further illustrated, another conduit, such as a second conduit **132**, may be provided for flowing refrigerant through the other of the first evaporator **110** or the second evaporator **112**. In the embodiments illustrated, conduit **132** flows refrigerant through second evaporator **112**. As illustrated, a valve **140**, such as a three-way valve, may be utilized to flow refrigerant from the condenser **104** to either the first conduit **130** or the second conduit **132**. Valve **140** may thus be operable to selectively and, as desired, alternatively, flow refrigerant to one of the first conduit **130** or second conduit **132**. Valve **140** may in exemplary embodiments as illustrated be disposed downstream of the compressor **102** and condenser **104**, and upstream of the first evaporator **110** and second evaporator **112**. Valve **140** may further be disposed upstream of the first expansion device **118** and second expansion device **120**, as illustrated, such that refrigerant may be selectively flowed from valve **140** through either the first expansion device **118** and the first evaporator **110** or the second expansion device **120** and the second evaporator **112**.

Referring to FIG. **2**, in some embodiments, while first conduit **130** is utilized to defrost the other of the first evaporator **110** or the second evaporator **112**, a heater **150** may be utilized to defrost the one of the first evaporator **110** or the second evaporator **112** to which first conduit **130** flows the refrigerant. Heater **150** may thus be configured for heating the one of the first evaporator **110** or the second evaporator **112**. Heater **150** may be selectively operable, and may operate for example when refrigerant is being flowed through the other of the first evaporator **110** or the second evaporator **112**, to reduce frost on the one of the first evaporator **110** or the second evaporator **112**.

Referring to FIG. **3**, in other embodiments, conduit **132** may further, in exemplary embodiments, be configured around the one of the first evaporator **110** or the second evaporator **112**, such as the first evaporator **110** as illustrated. For example, conduit **132** may be in contact with and/or coiled around, or otherwise at least partially surrounding, the evaporator. Such proximity of the conduit **132** to the evaporator may advantageously allow heat exchange, such as indirect heat exchange, to occur between the refrigerant flowing through the conduit **132** and this one of the first evaporator **110** or the second evaporator **112**. In exemplary embodiments, the associated expansion device **118**, **120**, such as expansion device **120** in the embodiments illustrated, may be disposed downstream of the one of the first evaporator **110** or the second evaporator **112**. Thus, refrigerant flowing through the conduit **132** at the location configured around the one of the first evaporator **110** or the second evaporator **112** may be generally warmer than that evaporator **110**, **112**, and may melt or otherwise facilitate removal of frost on the evaporator **110**, **112**. Such refrigerant may then be flowed through the associated expansion device **118**, **120** and through the other of the first evaporator **110** or the second evaporator **112** to cool the air flowed past the other of the first evaporator **110** or the second evaporator **112** and facilitate cooling of the fresh food compartment **12** or freezer compartment **14**.

As discussed, the first temperature sensor **52** and the second temperature sensor **54** may be disposed in the fresh food compartment **12** and freezer compartment, respectively, for measuring the temperatures therein. Sensors **52**, **54** may further be in operative communication with refrigeration system **100**, such as with the valve **140** or other suitable components. Refrigeration system **100** may thus operate based on temperature data obtained from the sensors **52**, **54**. Such operative communication may, for example, be through controller **11**, which may be in operative communication with valve **140** and/or other suitable components, such as first and second evaporators **110**, **112**. For example, sensors **52**, **54** may communicate temperature data to controller **11**. When the temperature in the fresh food compartment **12** or the freezer compartment **14** reaches a predetermined threshold (which may for example be user determined), the controller **11** may send signals to operate various system **100** components to cool that compartment. In particular, controller **11** may send signals to valve **140** to flow refrigerant through either the first conduit **130** or the second conduit **132**, depending on which compartment **12**, **14** requires cooling. Further, if both compartments require cooling, controller **11** may send signals to valve **140** to flow refrigerant first to one conduit **130**, **132**, and then to the other conduit **130**, **132**, such that the compartments **12**, **14** are selectively and alternatively cooled. Accordingly, the first evaporator **110** and the second evaporator **112** may be selectively and alternatively operable, such as by the controller **11** and based on temperature data, to cool compartments **12** and **14**.

Refrigeration systems **100** according to the present disclosure thus advantageously facilitate reductions or elimination of frost on evaporators such as evaporators **110**, **112**, thus increasing evaporator efficiency while reducing system **100** cost and complexity. Such advantages are facilitated by the arrangement of conduits which flow refrigerant to one evaporator while be configured around another evaporator, facilitating heating of the other evaporator during cooling operations of the first. Selective and alternative operation of dual evaporator can advantageously facilitate selective and alternative defrosting of the evaporators, such that minimal or no frost is develops on the evaporators during system **100** and appliance **10** operation.

This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to practice the invention, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they include structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal languages of the claims.

What is claimed is:

1. A refrigeration system for a refrigerator appliance, the refrigeration system comprising:

- a compressor for compressing a refrigerant;
- a first evaporator;
- a second evaporator;
- a first conduit for flowing the refrigerant through one of the first evaporator or the second evaporator, the first conduit including a first coil disposed upstream from the one of the first evaporator or the second evaporator, the first coil being positioned around the other of the first evaporator or the second evaporator such that heat exchange occurs between the refrigerant flowing through the first conduit at the first coil and the other of the first evaporator or the second evaporator; and
- a second conduit for flowing the refrigerant through the other of the first evaporator or the second evaporator, the second conduit including a second coil disposed upstream from the one of the first evaporator or the second evaporator, the second coil being positioned around the one of the first evaporator or the second evaporator such that heat exchange occurs between the refrigerant flowing through the second conduit at the second coil and the one of the first evaporator or the second evaporator.

2. The refrigeration system of claim **1**, further comprising an expansion device disposed upstream of the one of the first evaporator or the second evaporator for expanding the refrigerant before the refrigerant is flowed through the one of the first evaporator or the second evaporator.

3. The refrigeration system of claim **2**, wherein the expansion device is disposed downstream of the other of the first evaporator or the second evaporator, and wherein the expansion device is disposed downstream of the first coil.

4. The refrigeration system of claim **1**, further comprising a valve operable to selectively flow refrigerant to the first conduit or the second conduit.

5. The refrigeration system of claim **4**, wherein the valve is disposed downstream of the compressor and upstream of the first evaporator and the second evaporator.

6. The refrigeration system of claim **4**, wherein the valve is a three-way valve.

7. The refrigeration system of claim **1**, further comprising an expansion device disposed upstream of the other of the first evaporator or the second evaporator for expanding the refrigerant before the refrigerant is flowed through the other of the first evaporator or the second evaporator.

8. The refrigeration system of claim **7**, wherein the expansion device is disposed downstream of the one of the first evaporator or the second evaporator.

9. The refrigeration system of claim **1**, further comprising a heater configured for heating the one of the first evaporator or the second evaporator.

10. The refrigeration system of claim **1**, wherein the first evaporator and the second evaporator are selectively and alternately operable.

11. A refrigerator appliance, the refrigerator appliance comprising:

- a fresh food compartment;
- a frozen food compartment; and
- a refrigeration system, comprising
  - a compressor for compressing a refrigerant,
  - a condenser downstream of the compressor for receiving the refrigerant from the compressor and condensing the refrigerant,
  - a first evaporator configured for cooling the fresh food compartment,
  - a second evaporator configured for cooling the frozen food compartment,
  - a first conduit for flowing the refrigerant through one of the first evaporator or the second evaporator, the first conduit including a first coil disposed upstream from the one of the first evaporator or the second evaporator, the first coil being positioned around the other of the first evaporator or the second evaporator such that heat exchange occurs between the refrigerant flowing through the first conduit at the first coil and the other of the first evaporator or the second evaporator, and
  - a second conduit for flowing the refrigerant through the other of the first evaporator or the second evaporator, the second conduit including a second coil disposed upstream from the one of the first evaporator or the second evaporator, the second coil being positioned

around the one of the first evaporator or the second evaporator such that heat exchange occurs between the refrigerant flowing through the second conduit at the second coil and the one of the first evaporator or the second evaporator.

12. The refrigerator appliance of claim **11**, further comprising an expansion device disposed upstream of the one of the first evaporator or the second evaporator for expanding the refrigerant before the refrigerant is flowed through the one of the first evaporator or the second evaporator, and wherein the expansion device is disposed downstream of the first coil.

13. The refrigerator appliance of claim **11**, further comprising a valve operable to selectively flow refrigerant to the first conduit or the second conduit.

14. The refrigerator appliance of claim **11**, further comprising an expansion device disposed upstream of the other of the first evaporator or the second evaporator for expanding the refrigerant before the refrigerant is flowed through the other of the first evaporator or the second evaporator.

15. The refrigerator appliance of claim **11**, further comprising a heater configured for heating the one of the first evaporator or the second evaporator.

16. The refrigerator appliance of claim **11**, further comprising a first temperature sensor disposed in the fresh food compartment and a second temperature sensor disposed in the frozen food compartment, the first and second temperature sensors in operative communication with the refrigeration system.

17. A refrigerator appliance, the refrigerator appliance comprising:

a fresh food compartment;

a frozen food compartment; and

a refrigeration system, comprising

a compressor for compressing a refrigerant,

a condenser downstream of the compressor for receiving the refrigerant from the compressor and condensing the refrigerant,

a first evaporator configured for cooling the fresh food compartment,

a second evaporator configured for cooling the frozen food compartment,

a first conduit for flowing the refrigerant through one of the first evaporator or the second evaporator, the first conduit including a first coil disposed upstream from the one of the first evaporator or the second evaporator, the first coil being positioned around the other of the first evaporator or the second evaporator such that heat exchange occurs between the refrigerant flowing through the first conduit at the first coil and the other of the first evaporator or the second evaporator,

a second conduit for flowing the refrigerant through the other of the first evaporator or the second evaporator, the second conduit including a second coil disposed upstream from the one of the first evaporator or the second evaporator, the second coil being positioned around the one of the first evaporator or the second evaporator such that heat exchange occurs between the refrigerant flowing through the second conduit at the second coil and the one of the first evaporator or the second evaporator,

a valve operable to selectively flow refrigerant to the first conduit or the second conduit, and

an first expansion device disposed upstream of the one of the first evaporator or the second evaporator for expanding the refrigerant before the refrigerant is flowed through the one of the first evaporator or the second evaporator, wherein the first expansion device is disposed downstream of the first coil.

18. The refrigerator appliance of claim **17**, further comprising a second expansion device disposed upstream of the other of the first evaporator or the second evaporator for expanding the refrigerant before the refrigerant is flowed through the other of the first evaporator or the second evaporator.

19. The refrigerator appliance of claim **17**, further comprising a heater configured for heating the one of the first evaporator or the second evaporator.

20. The refrigerator appliance of claim **17**, further comprising a first temperature sensor disposed in the fresh food compartment and a second temperature sensor disposed in the frozen food compartment, the first and second temperature sensors in operative communication with the refrigeration system.

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